Serial No.: 09/714;406 Docket No.: 150789.01
Filing Date: 11/16/2000

REMARKS

Claims 23-27 have been added. Claims 1-15 and 20-27 are pending. Applicant respectfully requests reconsideration and allowance of this application.

Rejections under 35 USC 103(a) – He and Skene

Claims 1-16 and 20 stand rejected under 35 U.S.C. 103(a) as being anticipated by He et al. (U. S. Patent Number 6,671,259) (hereinafter "the He reference") in view of Skene et al. (U. S. Patent Application Pub. No. US 2001/0049741 A1) (hereinafter "Skene").

Claim 1 recites:

> A system for performing client-centric load balancing of multiple globally-dispersed servers, the servers being accessed by clients connecting through an ISP having a domain name server (DNS-ISP), the servers further having an authoritative domain name server (DNS-A) associated therewith, the system comprising:
> a first domain name server deployed on an Internet backbone (DNS-B); and
> a plurality of load balancing domain name servers (DNS-LBs) deployed in close physical proximity to the clients, the DNS-LBs having stored therein IP address information of the multiple globally-dispersed servers to be load balanced, the DNS-LBs each sending mapping information to the DNS-B relating the DNS-LB's IP address to an IP address of the DNS-ISP to which the DNS-LB is in close physical proximity, the DNS-LBs determining performance characteristics of each of the multiple globally-dispersed servers.

In the system recited in claim 1, the clients access the globally-dispersed servers through an ISP domain name server (DNS-ISP). A backbone (DNS-B) relates the IP address of a load balancing domain name server (DNS-LB) to the DNS-ISP wherein the DNS-LB is in close physical proximity to the DNS-ISP. Thus, this system relates, to an ISP domain name server, the IP address of the load balance server that is in close physical proximity to the ISP domain name server. The He reference fails to disclose or suggest such a system.

Instead, the He reference merely describes a system for wide area network load balance. The He reference describes the use of a load balancing server (LBS) selector 15 to handle a request from client systems 11a,b. (See the He reference, Fig. 1). LBS selector 15 selects one of the load balancing (LB) servers 17a,b and sends the request to the selected LB server. The LB servers 17a,b selects from a group of servers 19a so as to balance tasks among the servers 19a. (See the He reference, col. 2, line 66 to col. 4, line 49; Fig. 1). However, the LBS selector described by the He reference simply selects a server to balance tasks among the server, without taking physical proximity into account. Thus, the He reference fails to disclose or suggest the system in claim 1.

The Office Action acknowledges that the He reference fails to teach that the clients are placed in physical proximity with the DNS. However, the Office Action argues that Skene teaches that the clients communicate with local DNS and local ISP. (See Office Action, page 3, paragraph 4a). Although Skene describes a local DNS, Skene does not disclose or suggest that such local DNS is capable of performing any load balancing function. Rather, the system describes by Skene employs Extended Domain Name System (EDNS) servers to load balance the content servers. In contrast to the DNS-LB recited in claim 1, the EDNS server described in Skene appear to be located near the content servers, instead of the clients. Thus, Skene, in fact, teaches away from the system recited in claim 1.

Nothing in the He reference or Skene includes a suggestion to combine the two references. For the purpose of argument, even if the references can be combined, the proposed combination merely describes a system with a load balancing selector that selects a balancing server associated with a content server. However, the combination proposed by the Office Action fails to disclose or recited the subject matter recited in claim 1.

For the above-identified reasons, Applicant respectfully submits that claim 1 is patentable over the He reference and Skene, alone or in combination, and is allowable. Given that claims 2-9 depend from claim 1, claims 2-9 are also allowable for as least these reasons.

Claim 10 recites:

> A method of performing client-centric load balancing of multiple globally-dispersed servers, the servers being accessed by clients connecting through an ISP having a domain name server (DNS-ISP), the servers further having an authoritative domain name server (DNS-A) associated therewith, the method comprising the steps of:
>
> receiving IP address information from the DNS-A for the servers to be load balanced;
>
> providing the IP address information to a plurality of load balancing domain name servers (DNS-LB);
>
> receiving mapping information associating DNS-ISP IP address information to IP address information of a proximately located DNS-LB capable of determining server performance from a location physically proximate to the ISP's point of presence; and
>
> referring address inquiries from a DNS-ISP to a physically proximate DNS-LB in accordance with the mapping information.

As discussed above, neither the He reference nor Skene discloses or suggests deploying load balancing DNSs in close physical proximity to the clients or relating, to an ISP domain name server, the IP address of the load balance server that is in close physical proximity to the ISP domain name server. Thus, since the He reference and Skene do not describe the deployment and use of such load balance DNSs, the references cannot disclose or suggest receiving mapping information associating the DNS-ISP with a proximately located DNS-LB capable of determining server performance from a location physically

proximate to the ISP's point of presence. Without such mapping information, the references also fail to disclose or suggest referring address inquiries from a DNS-ISP to a physically proximate DNS-LB in accordance with the mapping information, as recited in claim 10.

For the above-identified reasons, Applicant respectfully submits that claim 10 is patentable over the He reference and Skene, alone or in combination, and is allowable. Given that claim 11 depends from claim 10, claim 11 is also allowable for as least these reasons.

Claim 12 recites:

> A method of performing client-centric load balancing of multiple globally-dispersed servers, the servers being accessed by clients connecting through an ISP having a domain name server (DNS-ISP), the servers further having an authoritative domain name server (DNS-A) associated therewith, the method comprising the steps of:
>
> obtaining, by a load balancing domain name server (DNS-LB), IP address information for a DNS-ISP located in close physical proximity to the DNS-LB;
>
> providing a mapping of an IP address of the DNS-LB to the IP address information of the DNS-ISP to an external domain name server;
>
> receiving IP address information for the servers;
>
> monitoring performance of the servers at the received IP addresses; and
>
> providing at least one IP address for a server in response to a name query selected based on the monitoring step.

As discussed above, neither the He reference nor Skene discloses or suggests deploying load balancing DNSs in close physical proximity to the clients or receiving mapping information associating a DNS-ISP with a proximately located DNS-LB. Thus, without the DNS-LB or the mapping information, the references also cannot disclose or suggest obtaining IP address information for a DNS-ISP located in close physical proximity

to the DNS-LB or providing a mapping of an IP address of the DNS-LB to the IP address information of the DNS-ISP to an external domain name server, as recited in claim 12.

For the above-identified reasons, Applicant respectfully submits that claim 12 is patentable over the He reference and Skene, alone or in combination, and is allowable. Given that claims 13-15 depend from claim 12, claims 13-15 are also allowable for as least these reasons.

Claim 20 recites:

A method of performing client-centric load balancing of multiple globally-dispersed servers, the servers being accessed by clients connecting through Internet service providers (ISPs) at a point of presence (POP), each ISP having a domain name server (DNS-ISP), the servers further having an authoritative domain name server (DNS-A) associated therewith containing information regarding the IP addresses of the servers, the method comprising the steps of:

deploying a first plurality of load balancing domain name servers (DNS-LBs) in close physical proximity to the ISP POPs;

deploying a second plurality of second level domain name servers (DNS-Bs) on the Internet backbones and regional provides;

communicating IP address information for the DNS-Bs to the DNS-As to enable the DNS-As to refer name queries to the DNS-Bs;

providing, by the DNS-LBs to the DNS-B, mapping information associating an IP address of the DNS-LB to an IP address of the physically proximate DNS-ISP to enable the DNS-B to refer name queries from a DNS-ISP to the physically proximate DNS-LB; and

communicating IP address information of the servers to the DNS-LBs;

monitoring, by the DNS-LBs at a location physically proximate to the ISP POP, performance of the servers; and

providing, by the DNS-LB in response to a query from the DNS-ISP, the IP address of a server based on the step of monitoring.

As discussed above, neither the He reference nor Skene discloses or suggests deploying load balancing DNSs in close physical proximity to the clients or receiving mapping information associating a DNS-ISP with a proximately located DNS-LB. Thus, the references also fail to disclose or suggest monitoring performance of the servers by the DNS-LBs at a location physically proximate to the ISP POP, as recited in claim 20. For the above-identified reasons, Applicant respectfully submits that claim 20 is patentable over the He reference and Skene, alone or in combination, and is allowable.

Rejections under 35 USC 103(a) – He, Berstis and Skene

Claims 21 and 22 stand rejected under 35 U.S.C. 103(a) as being anticipated by the He reference in view of Berstis et al. (U. S. Patent Number 6,115,745) (hereinafter "Berstis") and further in view of Skene.

Claims 21 and 22 recite:

21. A method of performing client-centric load balancing of multiple globally-dispersed servers, the servers being accessed by clients connecting through Internet service providers (ISPs) at a point of presence (POP), each ISP having a load balancing domain name server (DNS-ISP-LB), the servers further having an authoritative domain name server (DNS-A) associated therewith containing information regarding the IP addresses of the servers, the method comprising the steps of:

deploying a first plurality of measurement service agents (MServices) in close physical proximity to the ISP POPs;

monitoring, by the MServices at a location physically proximate to the ISP POP, performance of the servers; and

providing, by the DNS-ISP-LB in response to a query from the client, the IP address of a server based on the step of monitoring.

22. A method of performing client-centric load balancing of multiple globally-dispersed servers, the servers being accessed by clients connecting through Internet service providers (ISPs) at a point of presence (POP), each ISP having a load balancing domain name server (DNS-ISP-LB), the servers further having an authoritative domain name server (DNS-A) associated therewith containing information regarding the IP addresses of the servers, the method comprising the steps of:

deploying a first plurality of measurement service agents (MServices) in close physical proximity to the ISP POPs;

monitoring, by the MServices at a location physically proximate to the ISP POP, performance of the servers; and

providing, by the DNS-ISP-LB in response to a query from the client, an IP address of the MService.

As discussed above, neither the He reference nor Skene discloses or suggests deploying load balancing DNSs in close physical proximity to the clients. In fact, the references fail to disclose deploying any component of a load balancing system in close physical proximity to components of the client side system, such as a ISP POP. Thus, the references also fail to disclose or suggest deploying measurement service agents (MServices) in close physical proximity to the ISP POPs or monitoring performance of the servers by such MServices, as recited in claims 21 and 22. Berstis fails to remedy these deficiencies.

Berstis describes scheduling of distributed agents in a dialup network. However, the distributed agents described by Berstis are not a component of a load balancing system deployed in close physical proximity to the ISP POP. Berstis also fails to disclose or suggest that the agents are capable of monitoring the performance of servers.

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For the above-identified reasons, Applicant respectfully submits that claims 21 and 22 are patentable over the He reference, Berstis and Skene, alone or in combination, and are allowable.

New claims

Claims 23-27 have been added to the application. Applicant respectfully submits that these new claims are patentable over the He reference, Berstis and Skene for at least the reasons stated above.

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Conclusion

In view of the amendments and the remarks above, Applicant respectfully submits that this case is in condition for allowance and such allowance is earnestly solicited. In the event that there are any outstanding matters remaining in the above-identified application, the Office is invited to contact the undersigned to discuss this application.

Respectfully submitted,

MICROSOFT CORPORATION

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